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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/528,899	03/23/2005	Tatsuo Hoshino	K21402USWOC038435/0185657	4162

7590 10/09/2007

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EXAMINER	
ARIANI, KADE	

ART UNIT	PAPER NUMBER
1651	

MAIL DATE	DELIVERY MODE
10/09/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/528,899	HOSHINO ET AL.	
	Examiner	Art Unit	
	Kade Ariani	1651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 August 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *10-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *10-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

The office action of 02/09/07 is vacated.

The amendment filed on August 6, 2007, has been received and entered.

Claims 1-9 have been canceled.

Claims 10-15 are pending in this application and were examined on their merits.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 10-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stoddard et al. (Us patent No. 5,834,231) in view of Hancock et al. (FEMS Microbiology Letters, 2000, Vol.186, p.245-250), and further in view of Shinjoh et al. (Applied and Environmental Microbiology, 1995, Vol.61, No.2, p.413-420) and further in view of Smirnoff et al. (Annu. Rev. Plant Physiol. Plant Mol. Biol., 2001, Vol. 52, p.437-67) and further in view of Hancock & Viola (TRENDS in Biotechnology, July 2002, Vol.20, No.7, p.299-305).

Claims 10-15 are drawn to a process for the production of L-aldonolactone from L-aldohexose by a microorganism belonging to the genus *Pseudomonas or Gluconobacter* capable of producing L-aldonolactone from L-aldohexose, and, optionally, isolating the L-aldonolactone from the reaction mixture, wherein the L-aldonolactone is selected from the group consisting of L-gulono- 1,4 -1actone, L-gulonic acid, L-galactono- 1,4 -1actone, and L-galactonic acid, the L-aldohexose is selected from L-gulose or L-galactose, the microorganism is *P. putida* ATCC 21812 or *G. oxydans* IFO 3293, a growing culture or a resting cell reaction, the process is conducted for 1-120 h at a pH in the range of about 1 to about 9 and a temperature in the range of from about 13°C to 45°C, and the process is conducted for 1-120 h at a pH in the range of about 2 to about 8 and a temperature in the range of from about 18°C to 42°C.

Stoddard et al. teaches a process for the production of L-aldonolactone (2-keto L-gluconic acid) from L-sorbose by *G. oxydans* IFO 3293, the process is conducted for 1-120 h at a pH in the range of about 2 to about 8 and a temperature in the range of from about 18°C to 42°C (see abstract, column 5, lines 47-48, column 6, line 10, and 60, column 14, line 10).

Hancock et al. teaches a process wherein a growing culture of a microorganism (*S. cerevisiae)* produce L-galactono- 1,4 –lactone (L-aldonolactone) from a L-galactose (L-aldohexose)(p. 245, abstract, p. 248, Col.1 Lines 24-33, also Fig.1), cultures were grown to mid-exponential phase (p.246, Col.1, 3rd paragraph, 1st line).

Shinjoh et al. teaches a genetically modified strain of G. oxydans IFO 3293 expressing the gene encoding membrane-bound L-sorbosone dehydrogenase to improve the yield of 2- keto- L-gluconic acid (L-aldonolactone) (p. 413, abstract, and Col.2, last paragraph, also p.414, Col.1, Lines 1-4).

Smirnoff et al. discloses a novel enzyme L-galactose dehydrogenase that oxidizes L-galactose to L-gactono-1, 4 -lactone (p.441 and 422, Lines 5-6, Fig.1 reaction 7) has been purified and cloned, L-galactose dehydrogenase recognizes L-gulose, L-sorbosone and L-fucose, with a 45% similarity to the amino acid sequence of *Pseudomonas* L-fucose gehydrogenase (p.444, Last paragraph, p.445, 1st paragraph).

Hancock & Viola recites "genetic engineering has been used in strain improvement to enhance yields ...Gluconobacter *oxydans* is the species of choice for this purpose..." (P.300, Col.1, 2nd paragraph, Lines 1-2, and Col. 2, Lines 1-2), "recent resolution of the primary L-ascorbic acid pathway in higher plants will offer additional tools for process improvement via genetic engineering" (p.302, lines 27-30) and further recites " yeast cells are known to accumulate L-ascorbic acid when grown in the presence of non-physiological substrates L-gulonolactone, L-galactonolactone or L-galactose (p.303, Col.1, 2nd paragraph, Lines 12-15). Hancock & Viola recites L-galactose and L-galactonolactone as a cheap source of starting substrate (p.303, Col.2, Lines 2-3) and further discloses "the isolation of genes involved in L-ascorbic acid biosynthesis in plants might provide useful biochemical tools to extend the metabolic capacity of industrial microorganisms (p.303, Col.2, Lines 8-12).

Therefore, it would have been obvious to one of ordinary skill in the art to obtain a strain of *G. oxydans* IFO 3293 (or *P. putida)* capable of converting L-galactose or L-gulose to L-galactono-1, 4 -lactone or L-gulonolactone by cloning the gene encoding the enzyme as taught by Shinjoh et al. and Smirnoff et al., for the purpose of improving and enhancing the yield of the production of L-aldonolactone from L-aldohexose, since genetically engineered G. oxydans IFO 3293 was being used to convert intermediates of L-ascorbic acid pathway, to achieve the predictable results of extending the metabolic capacity of industrial microorganisms, to increase yield, and to lower the cost of the production by providing the ability to use cheap substrates L-galactose and L-galactonolactone.

Conclusion

No claims allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kade Ariani whose telephone number is (571) 272-6083. The examiner can normally be reached on 9:00 am to 5:30 pm EST Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Wityshyn can be reached on (571) 272-0926. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kade Ariani
Examiner
Art Unit 1651

Leon B. Lankford Jr.
Primary Examiner
Art Unit 1651